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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,598	11/30/2006	Mohammad Jilavi	P30581	3388

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EXAMINER	
SIMONE, CATHERINE A	
ART UNIT	PAPER NUMBER
1783	

NOTIFICATION DATE	DELIVERY MODE
03/22/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,598	JILAVI ET AL.	
	Examiner	Art Unit	
	CATHERINE SIMONE	1783	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *51-63,66-68,70,71 and 81-92* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *51-63,66-68,70,71 and 81-92* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/26/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/24/2011 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 51-63, 66-68, 70, 71 and 81-92 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The recitation "obtainable by" in claim 51 is deemed indefinite. It is not clear to the Examiner what is meant by "obtainable by". The scope of the claim in unclear. Appropriate correction is requested.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 51, 52, 55-60, 66, 67, 68, 70, 71, 81, 82 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289).

Regarding claims 51, 52, 55, 58 and 87, Mennig et al. disclose a glass substrate comprising an optical multi-layer system thereon, which substrate is obtainable by (a) applying a first free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to at least one surface of a glass substrate (col. 1, lines 49-53); (b) at least one of polymerizing and polycondensing the organic groups of the solid particles to form a first organically crosslinked layer on the at least one surface (col. 1, lines 54-56); (c) applying a second free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically crosslinked layer of (b), the second composition giving rise to a different refractive index than the first composition (col. 1, lines 57-60); (d) at least one of polymerizing and polycondensing the organic groups of the solid particles of the applied second composition to form a second organically crosslinked layer on the first organically crosslinked layer (col. 1, lines 61-63); (e) optionally, applying a further free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the organically crosslinked layer of (d) and at least one of polymerizing and polycondensing the organic groups of the solid particles of the further composition to form a further organically crosslinked layer on the second organically

crosslinked layer (col. 1, lines 64-67); (f) optionally, repeating (e) one or more times to form one or more further organically crosslinked layers (col. 1, lines 64-67), and (g) single-stage thermal consolidation of the organically crosslinked layers present and burnout of organic constituents thereof; with the proviso that for the uppermost layer (col. 2, lines 1-3 and col. 7, lines 62-67) the nanoscale inorganic solid particles do not comprise a polymerizable or polycondensable organic group, so that for the uppermost layer a polymerization or polycondensation of groups of the solid particles with formation of organic crosslinking does not take place before or during (g) (col. 7, lines 51-61).

Mennig et al. fail to disclose a crystalline transparent substrate, such as quartz, which is one of a precious stone and a semi-precious stone.

Edwards discloses a multi-layer coated optical device including a transparent substrate, such as glass or quartz (col. 4, lines 55-56). Thus, Edwards shows that both glass and quartz can be used as a substrate in an optical device since both are transparent materials. Therefore, glass and quartz are equivalents materials for use as a transparent substrate in an optical device.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, because glass and quartz were art-recognized equivalents at the time the invention was made, as shown by Edwards, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute quartz, a semi-precious stone, for glass as the substrate in Mennig et al. in order to provide a transparent crystalline substrate for an optical system.

Furthermore, it is to be pointed out that claim 51 defines the product by how the product was made. Thus, claim 51 is a product-by-process claim. For purposes of examination, product-by-process claims are not limited to the manipulation of the recited steps, only the structure

implied by the steps. See MPEP 2113. In the present case, the recited steps imply a structure having a crystalline substrate comprising a first free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group applied to at least one surface of a crystalline substrate and at least one of polymerizing and polycondensing the organic groups of the solid particles to form a first organically crosslinked layer on the at least one surface; and a second free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group applied to the first organically crosslinked layer and the second composition giving rise to a different refractive index than the first composition; and at least one of polymerizing and polycondensing the organic groups of the solid particles of the applied second composition to form a second organically crosslinked layer on the first organically crosslinked layer; and optionally, applying a further free-flowing composition which comprises nanoscale inorganic solid particles comprising at least one of a polymerizable and a polycondensable organic group to the second organically crosslinked layer and at least one of polymerizing and polycondensing the organic groups of the solid particles of the further composition to form a further organically crosslinked layer on the second organically crosslinked layer; and optionally, having one or more further organically crosslinked layers. As clearly described above, the combination of Mennig et al. and Edwards suggests such a product.

Regarding claims 56 and 57, Mennig et al. fail to specifically disclose the substrate being either planar or curved. It would have been an obvious matter of design choice to change the shape of the substrate in Mennig et al. to be either planar or curved, since such a modification would have involved a mere change in the shape of the substrate. A change in shape is generally

recognized as being within the level of ordinary skill in the art, absent unexpected results. MPEP 2144.04 (IV).

Regarding claim 59, Mennig et al. disclose two sides of the substrate being provided with an optical multi-layer system (col. 9, lines 34-42).

Regarding claim 60, Mennig et al. disclose the substrate comprising a sheet (col. 9, line 34).

Regarding claim 66, Mennig et al. disclose the nanoscale particles comprising one or more compounds selected from SiO_2, TiO_2, ZrO_2, ZnO, Ta_2O_5, SnO_2 and Al_2O_3 (col. 2, lines 55-58) and the polymerizable or polycondensable organic groups comprise organic radicals which comprise at least one of a (meth)acryloyl group, a vinyl group, an allyl group and an epoxy group (col. 3, lines 25-30).

Regarding claim 67, Mennig et al. disclose the optical multi-layer system comprising an interference layer system (col. 8, lines 3-5).

Regarding claim 68, Mennig et al. disclose the optical multi-layer system comprising an anti-reflection layer system (col. 8, lines 3-5).

Regarding claim 70, Mennig et al. disclose one or more organically crosslinked layers being formed at a temperature of up to about 130°C (col. 7, lines 39-43).

Regarding claim 71, Mennig et al. disclose the single stage thermal consolidation step being carried out at a temperature of at least 400°C (col. 7, lines 55-61).

Regarding claim 81, Mennig et al. disclose the single stage thermal consolidation step being carried out at a temperature of at least 100 K/min (col. 8, lines 1-2).

Regarding claim 82, Mennig et al. disclose the single stage thermal consolidation step being carried out at a temperature of from 400°C to 800°C for a period of from 1 minute to 1 hour (col. 7, lines 55-61).

7. Claims 54 and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289) as applied to claims 51 and 71 above, and further in view of Landau (US 4,188,444).

Regarding claims 54 and 90, Mennig et al. and Edwards teach the claimed crystalline substrate comprising an optical multi-layer system thereon, as shown above.

Mennig et al. and Edwards both fail to teach a crystalline substrate comprising PbS or selenium.

Landau teaches that glass can contain selenium in order to form an optical glass (col. 1, lines 60-62 and col. 2, lines 60-64). Thus, Landau shows that optical glass can contain selenium.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the glass substrate in Mennig et al. to include selenium as suggested by Landau in order to provide a transparent crystalline glass substrate for an optical system.

8. Claims 62, 88 and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289) as applied to claims 51, 60 and 71 above, and further in view of Zimmermann et al. (US 2002/0017452).

Regarding claims 62, 88 and 92, Mennig et al. and Edwards teach the claimed crystalline substrate comprising an optical multi-layer system thereon, as shown above.

Mennig et al. and Edwards both fail to teach a crystalline substrate comprising a watchglass of sapphire.

Zimmermann et al. teach antireflection coatings being applied to inorganic optically transparent substrates such as sapphire glass and other kinds of natural glass (paragraph 0047). Thus, Zimmermann et al. show that both glass and sapphire glass are inorganic optically transparent materials. Therefore, glass and sapphire glass are equivalents materials for use as a transparent substrate in an optical device.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, because glass and sapphire glass were art-recognized equivalents at the time the invention was made, as shown by Zimmermann et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute sapphire glass for glass as the substrate in Mennig et al. in order to provide a transparent crystalline substrate for an optical system.

9. Claims 61, 88 and 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289) as applied to claims 51, 60 and 71 above, and further in view of Forrest et al. (US 6,091,195).

Regarding claims 61, 88 and 91, Mennig et al. and Edwards teach the claimed crystalline substrate comprising an optical multi-layer system thereon, as shown above.

Mennig et al. and Edwards both fail to teach a crystalline substrate comprising a sheet of sapphire.

Forrest et al. teach an optical device (light emitting display) including a transparent substrate, such as glass, quartz or sapphire (col. 4, lines 35-37). Thus, Forrest et al. show that glass, quartz and sapphire can be used as a substrate in an optical device since they all are transparent materials. Therefore, glass, quartz and sapphire are equivalents materials for use as a transparent substrate in an optical device.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, because glass and sapphire were art-recognized equivalents at the time the invention was made, as shown by Forrest et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute sapphire for glass as the substrate in Mennig et al. in order to provide a transparent crystalline substrate for an optical system.

10. Claims 52, 85, 86 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289) as applied to claims 51 and 71 above, and further in view of Albares et al. (US 4,696,536).

Regarding claims 52, 85, 86 and 88, Mennig et al. and Edwards teach the claimed crystalline substrate comprising an optical multi-layer system thereon, as shown above.

Mennig et al. and Edwards both fail to teach a crystalline substrate comprising lithium niobate and lithium tantalate.

Albares et al. teach an optical device including a transparent substrate, such as glass, sapphire, lithium niobate or lithium tantalate (see abstract). Thus, Albares et al. show that glass, sapphire, lithium niobate and lithium tantalite are all common transparent substrates for use in an

optical device. Therefore, glass, sapphire, lithium niobate and lithium tantalate are equivalents materials for use as a transparent substrate in an optical device.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, because glass, sapphire, lithium niobate and lithium tantalate were art-recognized equivalents as transparent substrates at the time the invention was made, as shown by Albares et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute sapphire, lithium niobate or lithium tantalate for glass as the substrate in Mennig et al. in order to provide a transparent crystalline substrate for an optical system.

11. Claims 52, 53, 60, 63, 83, 84 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mennig et al. (US 6,455,103) in view of Edwards (US 3,493,289) as applied to claims 51 and 71 above, and further in view of Kaspaul et al. (US 3,698,946).

Regarding claims 52, 53, 83 and 89, Mennig et al. and Edwards teach the claimed crystalline substrate comprising an optical multi-layer system thereon, as shown above.

Mennig et al. and Edwards both fail to teach a crystalline substrate comprising PbS.

Kaspaul et al. teach an optical device including a transparent substrate, such as glass, silicon, quartz or lead sulfide (col. 2, lines 40-48). Thus, Kaspaul et al. show that glass, quartz, silicon and lead sulfide are all known transparent substrates for use in optical devices. Therefore, glass, quartz, silicon and lead sulfide are equivalents materials for use as a transparent substrate in an optical device.

Mennig et al. teach a multi-layered optical system including a glass substrate. Thus, because glass, quartz and lead sulfide were art-recognized equivalents as transparent substrates at

the time the invention was made, as shown by Kaspaul et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute silicon or lead sulfide (PbS) for glass as the substrate in Mennig et al. in order to provide a transparent crystalline substrate for an optical system.

Regarding claims 60, 63 and 84, Mennig et al. fail to disclose the substrate being a wafer. It would have been an obvious matter of design choice to change the shape of the substrate in Mennig et al. to be a wafer, since such a modification would have involved a mere change in the shape of the substrate. A change in shape is generally recognized as being within the level of ordinary skill in the art, absent unexpected results. MPEP 2144.04.

Response to Arguments

12. Applicant's arguments, see pages 11-12, filed 1/24/2011 with respect to the rejection of claims 51, 52, 55-60, 64, 65 and 67-80 under 35 U.S.C.103(a) over Mennig in view of Edwards have been fully considered but they are not persuasive.

Applicants argue "there is no apparent reason for one of ordinary skill in the art to replace glass by a material such as quartz in the process of MENNIG, i.e., a process which clearly requires a material which can withstand temperatures of at least 400°C for extended periods of time".

This argument is not deemed persuasive. It is well known that quartz has a very high melting point which is much greater than 400°C, i.e. 1713°C (see Table from Hawley's Condensed Chemical Dictionary attached hereto). Thus, quartz is a material which can withstand temperatures of at least 400°C for extended periods of time. Thus, there is reason for one of

ordinary skill in the art to replace the glass by a material such as quartz in the process of Mennig. Accordingly, the 35 U.S.C. 103(a) rejection over Mennig in view of Edwards stands.

13. Applicant's arguments, see pages 12-13, filed 1/24/2011, with respect to the rejection of claims 53 and 63 under 35 U.S.C.103(a) over Mennig in view of Edwards and Arney have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Kaspaul et al. (US 3,698,946), which is shown above.

14. Applicant's arguments, see page 14, filed 1/24/2011 with respect to the rejection of claim 54 under 35 U.S.C.103(a) over Mennig in view of Edwards and Landau have been fully considered but they are not persuasive.

Applicants argue that "even if the glass of Landau were assumed to contain small quantities of selenium, it would not be a crystalline substrate".

This argument is not deemed to be persuasive. Landau was merely cited to teach that glass can contain small quantities of selenium (col. 2, lines 62-64). Thus, it would have been obvious to one of ordinary skill in the art to modify the glass in Mennig to contain selenium as suggested by Landau in order to form a glass substrate. The glass substrate of Mennig is deemed to be a crystalline substrate when modified to contain small quantities of selenium as suggested by Landau, since the glass is containing selenium, even if it is small quantities of selenium. Accordingly, the 35 U.S.C. 103(a) rejection over Mennig in view of Edwards and Landau stands.

15. Applicant's arguments, see page 15, filed 1/24/2011 with respect to the rejection of claim 62 under 35 U.S.C.103(a) over Mennig in view of Edwards and Zimmermann have been fully considered but they are not persuasive.

Applicants argue "there is no apparent reason for one of ordinary skill in the art to replace regular glass by a material such as sapphire glass in the process of Mennig, i.e., a process which clearly requires a material which can withstand temperatures of at least 400°C for extended periods of time".

This argument is not deemed persuasive. It is well known that sapphire has a very high melting point which is much greater than 400°C, i.e. 2040°C (see Table from Hawley's Condensed Chemical Dictionary attached hereto). Thus, sapphire is a material which can withstand temperatures of at least 400°C for extended periods of time. Thus, there is reason for one of ordinary skill in the art to replace the glass by a material such as sapphire in the process of Mennig. Accordingly, the 35 U.S.C. 103(a) rejection over Mennig in view of Edwards and Zimmermann stands.

16. Applicant's arguments, see page 16, filed 1/24/2011 with respect to the rejection of claims 61 and 66 under 35 U.S.C.103(a) over Mennig in view of Edwards and Forrest have been fully considered but they are not persuasive.

Applicants argue "there is no apparent reason for one of ordinary skill in the art to replace regular glass by a material such as sapphire glass in the process of Mennig, i.e., a process which clearly requires a material which can withstand temperatures of at least 400°C for extended periods of time".

This argument is not deemed persuasive. It is well known that sapphire has a very high melting point which is much greater than 400°C, i.e. 2040°C (see Table from Hawley's Condensed Chemical Dictionary attached hereto). Thus, sapphire is a material which can withstand temperatures of at least 400°C for extended periods of time. Thus, there is reason for one of ordinary skill in the art to replace the glass by a material such as sapphire in the process of Mennig. Accordingly, the 35 U.S.C. 103(a) rejection over Mennig in view of Edwards and Forrest stands.

For the reasons given above, the claims of the present application fail to patentably define over the cited prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CATHERINE SIMONE whose telephone number is (571)272-1501. The examiner can normally be reached on Monday-Friday 9:30-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Catherine Simone/
Examiner, Art Unit 1783
March 15, 2011